
Top 10 Issues Encountered During Infrastructure Assessments

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Introduction

This document highlights the most common issues identified by Citrix Consulting Services (CCS) during Infrastructure Assessments (IA). CCS conducts IAs to obtain the business and technical drivers of the project, examine the client's current (or proposed) infrastructure, determine requirements for the MetaFrame implementation, and identify potential risk areas for the engagement. Typically, the findings of the IA are used as inputs in the MetaFrame design.

While each IA is unique, CCS has found that certain issues persist from client to client. Therefore, this document identifies these common issues, describes why they pose a potential risk to the implementation, and provides CCS' best practices and recommendations to overcome them.

Top 10 Issues

Single-Farm Versus Multiple-Farm Architecture

MetaFrame XP has multiple features that allow clients to scale a server farm well beyond the limits of MetaFrame 1.8. Therefore, single-farm designs and implementations are more common.

In many cases, the single-farm solution is appropriate and successful. However, there are still limitations on the number of zones, servers, applications, and users a MetaFrame XP farm can sustain. Therefore, CCS typically does not recommend single-farm solutions because they do not meet the changing requirements of our larger Enterprise and ASP customers, especially those where these factors are unknown.

Single-farm solutions have to span multiple WAN locations for most of our global customers. This requires adequate bandwidth and network redundancy due to the constant communication between the Zone Data Collectors (ZDCs).

Finally, farm administration is a risk because remote administrators have to contact the data store across the WAN. Even if the data store is replicated, only the parent data store database can be updated. While queries can be performed locally in a replicated environment, all modifications must still be directed to the parent database. This requires extensive configuration and monitoring because users cannot connect to the data store directly. To access the data store, users must first establish a CMC connection to a MetaFrame server in the farm. Therefore, users have to know which MetaFrame servers have connections configured to the parent database when making updates. Currently, there is no MetaFrame feature that can determine if users are connected to the parent database.

CCS recommends designing a multiple-farm environment for large MetaFrame implementations. The multiple-farm design gives clients an open architecture that allows them to scale the implementation. Typically, farms are divided by geographical location, but the underlying factor is to always keep the MetaFrame servers close to user, or application, data.

Profile Management

Most clients use roaming profiles because they allow their users' personal settings to persist across multiple MetaFrame servers and sessions while using only a single user account. In addition, roaming profiles are centrally stored and easily configurable, which helps increase their manageability.

Unfortunately, roaming profiles have several disadvantages. Elements such as the profile's size and frequent corruption decrease the overall performance, manageability, and predictability of the MetaFrame environment. Furthermore, roaming profiles may vary significantly from user to user, making it harder for the client to maintain consistency across users' sessions.

The following list outlines the key issues with roaming profiles:

- **Saves Only the Last Session Information.** Enterprise-class deployments of MetaFrame often require the segregation of applications across multiple server sets. Each of these server sets updates the roaming profiles differently depending on the applications installed. Because only one roaming profile is used per user, only the last session's information is saved to the profile.
- **Limited Size Control.** Even though administrators can set a maximum size for roaming profiles and/or redirect users' Shell folders to their home drives, it is difficult to regulate the profile's size because it is hard to control the data changed, deleted, or added during a user's session.
- **Increased Network Traffic.** During logon, the user's profile is loaded from a central location. If the profile is large, network utilization increases and the user experiences extended logon times, which is often unacceptable in an XP environment.
- **Susceptible to Corruption.** Often, a user has several sessions open concurrently. If the user closes all sessions simultaneously, each session attempts to write back to the same roaming profile. Typically when this occurs, the user's profile becomes corrupted and unusable. Therefore, personal settings are lost.
- **Limited Standardization.** Because the data changed, deleted, or added to users' roaming profiles is not regulated, consistency between user sessions is unpredictable, which makes errors harder to troubleshoot and diagnose.

CCS recommends using an alternate profile solution. If possible, use mandatory profiles with folder redirection. Mandatory profiles are more predictable, stable, and typically smaller. Folder redirection allows the administrator to redirect user folders such as "My Documents," "Favorites," and "Application Data" to the users' Home drives.

Unfortunately, users cannot save personal registry settings when using mandatory profiles. However, when applications are published seamlessly, the lack of personal settings is typically not an issue. This is also the case when the applications published do not use the registry.

Policy Management

Policies under Windows 2000 can have both positive and negative impacts on the client environment. Due to the hierarchical structure of Active Directory, the policies can be implemented at multiple levels. This complexity can make it extremely difficult to determine the impact on the MetaFrame environment. Many times, changes to Group Policy Objects (GPOs) are implemented without proper change control procedures. CCS has been involved in several troubleshooting incidents where GPOs were applied unknowingly to the MetaFrame servers and were the root cause of the error.

GPOs are powerful tools that help maintain standardization. Therefore, CCS recommends clients continue to use them in their implementations. However, be mindful of the impact of "inheritance" and constantly monitor the settings applied to the servers.

Printing Configuration

A well-managed printing environment is a major component of a scalable and stable MetaFrame deployment. Three areas must be monitored:

- **Printer Drivers.** Printer drivers are often the root cause of server blue-screens in Windows NT 4.0 Terminal Server environments because drivers are loaded at the kernel level. Therefore, when a driver error occurs, it affects all users on the server. In Windows 2000, most drivers are loaded at the user level. Therefore, driver errors affect only the current session. While driver errors are less severe in a Windows 2000 environment, they are still an annoyance.
- **Limited Number of Remote Procedure Call (RPC) Connections.** Each connected printer requires an RPC connection. The operating system has a finite number of RPC connections available. Therefore, printers can negatively affect the scalability of the server.
- **Network Utilization and Latency.** Printing to locally attached printers (for example, local printers autocreated, mapped to a local port, or connected using a MetaFrame Virtual Channel) can increase latency and limit available bandwidth. Therefore, keep local printing to a minimum. Also give careful consideration when using autocreated printers because all print traffic is sent through ICA to the local client, thus competing with session traffic for available bandwidth.

CCS recommends using a trusted print source, or MetaFrame XP's driver replication utility, to manage printer drivers. Install only drivers thoroughly tested in a Terminal Server environment in a production environment.

Limit the number of printers mapped per user. If possible, connect only the user's default printer to preserve the number of RPC connections.

Also, do not traverse the client device when printing to network printers. Instead, send the print job from the MetaFrame server directly to the printer or print server. Mapping the network printers through a logon script or assigning them to users and groups using XP's Printer Management functionality can accomplish this. The Printer Management functionality also allows administrators to set bandwidth limits on printer traffic.

Inadequate Testing Environment and Procedures

Many clients do not have a dedicated test facility for the MetaFrame environment. Instead, they have isolated servers used for application integration testing or have identified certain servers in the production environment as "test" units. Several clients also do not have formal testing procedures. Instead, changes are made directly to the production environment.

CCS recommends having a dedicated testing environment for the MetaFrame implementation. Most changes, especially those impacting MetaFrame, affect the entire network, not just standalone servers. Therefore, all clients should be in an isolated test lab whose environment closely resembles the production environment (that is, similar servers, routers, switches, firewalls, client devices, and so forth). This allows the client to accurately identify the scalability bottlenecks in the implementation. Often, it is not the MetaFrame server that causes the bottleneck or issue.

Do not make modifications directly to the production environment. To maintain a stable environment, subject all changes to a rigorous test process before going into production, regardless of simplicity, due to the number of users who can be affected adversely by the change.

Limited Standardization

Clients, especially in the ASP market, tend to sacrifice standardization to create a MetaFrame environment that encompasses every possible client requirement or unknown. The problem with limiting standardization is that it affects the manageability, supportability, and scalability of the environment. While it is important to maintain an open architecture, do not overlook standardization.

The following are common areas that typically lack standardization.

- **MetaFrame Server Configuration.** Different versions of the operating system, service packs, hotfixes, performance, and security settings commonly attribute to instability in the environment and inconsistencies between user sessions. CCS recommends, at a minimum, that the operating system and MetaFrame configurations be standardized across all servers regardless of their application set. Consider a fully scripted build process to maintain consistency and eliminate potential user error during the server build. The aim is to make the application sets the only variant on the servers.
- **Server Hardware.** Keep server equipment identical whenever possible. Varying hardware may require additional build procedures and management utilities. Perform scalability tests on all hardware configurations to identify each configuration's unique bottlenecks. Consider varying configurations only if there are resource-intensive applications that require more memory or processing speeds than other applications deployed.
- **ICA Client Environment.** Standardize supported client devices, operating systems, and delivery mechanisms. Regulate management of client configurations, versions, and update strategies to increase stability and maintainability.

Limited Support Structure

A client's support structure is the initial face to the end-user. If you are unresponsive at the support level, the entire project is in jeopardy of failure regardless of the strength of the technical infrastructure. Many clients do not have suitably trained MetaFrame support staff to meet their Service Level Agreements (SLAs). Others do not have an enterprise-level, call-tracking system to monitor issues and do not use the support features provided with MetaFrame such as the Shadow Taskbar.

An acceptable support structure has the following characteristics:

- The process facilitates a timely resolution
- End-users feel the support tiers are responsive to their issues
- The process minimizes the number of support tiers required
- Support maintains a single point of contact for the end-user
- Facilitates issue tracking
- Increases accountability; issues have ownership throughout the support process
- Maintains consistency in the support process

Train staff at all levels in the support chain, at varying degrees, in MetaFrame. Make this an ongoing process as new software and hardware is deployed within the environment. First tier personnel do not have to be MetaFrame experts. However, they must be able to troubleshoot common issues and use the administrative tools available such as Citrix Server Administrator, Connection Configuration Manager, and the Shadow Taskbar.

Application Integration

Many clients install their entire application set on every MetaFrame server. This makes the environment easier to implement, but it decreases the manageability of the environment. First, each server must be updated when an application changes. It increases the amount of regression testing required because the application set is larger and it is difficult to accurately determine the server's user capacity because average utilization is nearly impossible to gauge.

CCS recommends the applications be separated into different server groups based on the applications' compatibility, dependency and integration, update frequency, usage, criticalness, and footprint. This helps to increase total uptime and availability, helps maximize server resources, and mitigates change control.

Networking Resources

Clients must have the network resources to monitor and offset the network latency seen in most WAN environments. Network latency can have a negative impact on client-to-server communication in MetaFrame implementations. It can lead to delayed response times, extend the logon process, and even cause session disconnects.

CCS recommends network equipment with Quality of Service (QoS) features that can mitigate the risk of high network latency across WANs. This equipment can be used to prioritize ICA traffic and/or guarantee network bandwidth for session information.

Marketing and Communication

Proper marketing and communication (MC) are critical components to the success of the project. An effective MC plan includes communication of the business drivers and clearly outlines the impact to the end-users, surrounding IT departments, and management. Use verbal and written communication to distribute the plan through staff meetings, presentations, e-mail, corporate Web sites, FAQs, and so on.

Many projects fail due to the lack of proper communication. An effectively designed and implemented MC plan helps mitigate this risk.



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